

PHY138Y - Mechanics - Homework Assignment #1

This assignment is due at your first tutorial: Wed. Sept. 22, Thur. Sept. 23 or Fri. Sept. 24.

From the Textbook (80%)

Chapter 1: 9, 16, 22, 64

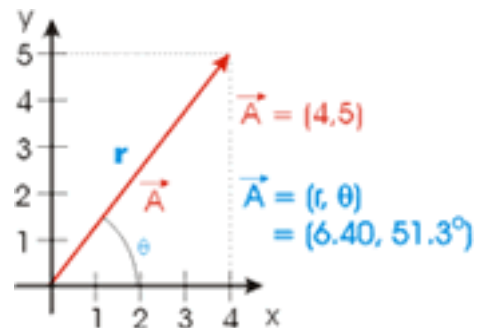
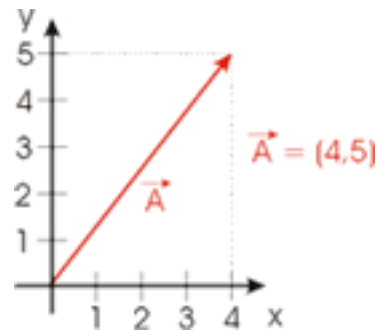
Supplemental Problem (20%)

A vector has Cartesian coordinates of (4, 5), as shown.

$$\vec{A} = (x, y) = (4, 5)$$

The same vector can be completely specified in terms of its polar coordinates r and θ where r is the magnitude of the vector and θ is the angle it makes with the x axis.

$$\vec{A} = (r, \theta) = (6.40, 51.3^\circ)$$



Of course, the relation between these two coordinate system's representation of the vector is:

$$r = \sqrt{x^2 + y^2}$$

$$\theta = \tan^{-1} \left(\frac{y}{x} \right)$$

A second vector **B** has Cartesian coordinates (4, 2).

1. Express **B** in polar coordinates.
2. Find **A** + **B** by adding the Cartesian coordinates. Express the answer in polar coordinates.
3. Add the polar coordinates of **A** and **B**. Compare to answer 2.